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MANITOBA

ECONOMIC MULTIPLIERS

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PREFACE

This publication presents economic multipliers, intensity ratios and supply ratios for the Manitoba economy, and examples of their use. All data presented in this report has been derived from the Statistics Canada Inter-Provincial Input- Output Tables for 1984 with selected updates to 1991. The multipliers presented are at the Small Level (16 industries and 43 commodities) and Medium Level (49 industries and 93 commodities) of aggregation, and represent economic impacts to Manitoba only.

Economic multipliers and intensity ratios are used to measure the total impact to the Manitoba economy, resulting from the direct impact of a project or activity, in terms of Gross Domestic Product (GDP), Labour Income and Employment levels.

If the needs of a particular project exceed the capability of the tables provided in this report, the Manitoba Bureau of Statistics (MBS) can produce detailed economic impact assessments on a cost recovery basis, using project expenditure data. These simulations will be run through the MBS Economic Impact Assessment Model (Worksheet Level) which provides a great degree of detail (216 industries and 602 commodities). The Worksheet Level Model allows for more exact results, and a greater capacity for fine tuning various parameters.

In addition, MBS can provide estimates of the provincial taxes that may result from a particular project through the use of the MBS Provincial Taxation Model.

While the mechanics of multiplier analysis are relatively simple, misunderstandings often invalidate the results. To avoid common pitfalls of multiplier use, such as using the wrong multiplier or applying it incorrectly, the user should be familiar with both the data and the multipliers to be used; what they represent and what their limitations are.

If there are any questions or comments regarding this report, the MBS Economic Impact Assessment Models or the MBS Provincial Taxation Model, please contact:

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I. EXECUTIVE SUMMARY

The multipliers presented in this report are used to estimate the total Manitoba economic change, resulting from a direct increase in demand for a particular commodity or industry. Total economic change refers to the sum of direct effects, indirect effects and induced effects, and is measured in terms of Gross Domestic Product (GDP) at Factor Cost, GDP at Market Prices, Labour Income and Employment.

Tables B1 and C1, present **Commodity Intensity Ratios** for Manitoba, which have been derived from the Small and Medium Levels of the MBS Economic Impact Assessment Model. These intensity ratios measure the total in-province impact per dollar of purchase, in terms of GDP at factor cost, labour income and employment, for 43 (Small Level) and 93 (Medium Level) commodity types.

Tables B2 (Small Level) and C2 (Medium Level) present **Industry Intensity Ratios** for 16 and 49 industry groups in Manitoba, respectively. These tables are analogous to Tables B1 and C1 in function and use, but are from the perspective of industry and province of production rather than commodity and province of purchase.

Tables B3 and C3 present **Traditional Industry Multipliers** for 13 (Small Level) and 46 (Medium Level) industry groups in Manitoba. These multipliers are used to estimate the total change in Manitoba GDP, labour income and employment, based on the direct change in each of these economic measures resulting from a direct change in output for a particular industry.

Tables B4 and C4 present **Commodity Supply Ratios** for the Small Level and Medium Level commodity groups. These indicate the degree to which in-province demand for a particular commodity will typically be met by Manitoba producers, as compared to being supplied from elsewhere in Canada or the rest of the world.

The specific multipliers to be used, whether they be Traditional Industry Multipliers or Commodity or Industry Intensity Ratios, and at the Small or Medium Level of aggregation, depends on the available project information. The following diagram is provided as an aid to determining the appropriate type of multiplier.

In general, if more detailed information is available, better estimates of economic impacts can be produced. However, users of multipliers should be cautioned that owing to certain methodological limitations, multipliers are best when used for comparative rather than absolute analysis.

To achieve meaningful results from multipliers there are two points to remember: (1) understand the available data, and (2) understand the various multipliers, their uses and limitations.

MULTIPLIERS: USE OF TABLES

INFORMATION AVAILABLE	USE TABLE	PROCEDURE
Dollar value of a change in demand for a Commodity in Manitoba.	B1 or C1	Locate appropriate commodity in table, and multiply dollar value of change in demand by intensity ratios presented.
Dollar value of a change in output of an Industry in Manitoba — Only have dollar value of change in output.	B2 or C2	Locate appropriate industry in table, and multiply dollar value of change in output by intensity ratios presented.
Dollar value of a change in output of an Industry in Manitoba — Have detailed cost information, sufficient to calculate Direct GDP, Labour Income and Employment.	B3 or C3	Locate appropriate industry in table, and multiply the calculated direct components by the relevant multipliers presented.

II. MULTIPLIERS: INTRODUCTION

The estimate of Gross Domestic Product (GDP) published in the MBS Provincial Economic Accounts is a measure of unduplicated economic production for the province, in that it measures only the value of final transactions. All inter-business purchases and sales associated with intermediate production have been cancelled out.

If GDP were to include transactions at the intermediate stages of production, and include them again when industries making the intermediate purchases sell the reformatted goods into final demand (i.e., to households for consumption, to business for investment, or for export) the value of these transactions would be double-counted.

Therefore, in calculating GDP all intermediate transactions are lost. Input-Output accounts constitute a means of retrieving this information concerning the inter-industry flows of goods and services within the economy.

The most used and familiar components of Input-Output accounts are the economic multipliers, of which there are two main types; **"Simple"** multipliers and **"Total"** multipliers. This report presents Total rather than Simple multipliers, since users tend to be most interested in total rather than partial effects. These multipliers are calculated as follows:

$$\textbf{Simple Multiplier} = \frac{\textbf{Direct Effects + Indirect Effects}}{\textbf{Direct Effects}}$$

$$\textbf{Total Multiplier} = \frac{\textbf{Total Effects}}{\textbf{Direct Effects}}$$

$$= \frac{\textbf{Direct Effects + Indirect Effects + Induced Effects}}{\textbf{Direct Effects}}$$

An increase in demand for a particular commodity has three effects. First, **Direct Effects** refer to the impact on firms which expand production to directly meet the increased demand. Second, **Indirect Effects** refer to the ripple effect as directly impacted firms demand increased inputs from other firms. Third, **Induced Effects** refer to the household effect that results from increased consumer spending (which is made possible, because as directly and indirectly impacted firms expand production they require additional labour inputs, thus increasing labour income going to households). **Total Effects** refer to the sum of direct, indirect and induced effects.

In this report, multipliers are presented for GDP at Factor Cost, the value of goods and services produced by Manitoba industries. However, MBS is also able to produce multipliers for GDP at Market Prices, the total value of goods and services produced in the Manitoba economy. GDP at Market Prices is equal to GDP at Factor Cost plus Indirect Taxes minus Subsidies. **Table A4** presents a comparison of GDP at Market Prices to GDP at Factor Cost, for selected industries at the Medium Level of aggregation. It also presents the composition of GDP at Market Prices in terms of the contribution from direct, indirect and induced effects.

III. MULTIPLIERS: LIMITATIONS

Economic multipliers can be a useful component of the decision making process, if users are aware of their limitations. Some of these limitations are: the provincial input-output model (from which the multipliers are derived) is static; it does not recognize production capacity limits; and is based on average patterns of technology and costs at a fixed point in time. For these and other reasons, multiplier analysis cannot provide a complete or absolute measure of the impact of economic change.

For example, given an increase in demand for a particular commodity, the model assumes that: (1) production can be met without a change in capacity (i.e., no plant expansion is required); (2) Manitoba industries will maintain their fixed share of the market; and (3) the increase in output will be accomplished at the average cost of production using 1984 technology (i.e., the base year for the model).

In reality, it is unlikely that any of these assumptions would hold. It is likely there would be greater or lower than average costs. In addition, there have been significant changes in technology in many industries since 1984. It should be noted that some of these problems can be corrected by using an updated input structure based on current experience and subjecting it to a simulation using the MBS Economic Impact Assessment Model (c.f., Appendix A).

As a result, users of multipliers should treat results as general estimates only, not as absolute values. Furthermore, economic multipliers are best when used for comparative rather than absolute analysis. That is, it is preferable to use multipliers to determine which of two or more activities has the greater economic impact, rather than to determine the absolute impact of a single event.

IV. MULTIPLIERS: TYPES AND USES

MBS can calculate multipliers at three different levels of detail: Small, Medium and Worksheet. This report presents a number of multiplier types at the Small and Medium Levels of aggregation.

Multipliers can be derived for industries or commodities, and expressed in either absolute form (Traditional Multipliers) or as Intensity Ratios. In addition, five different economic measures can be determined: GDP at Market Prices (the net benefit to the economy), GDP at Factor Cost, Labour Income, Employment, and Gross Production (the gross benefit to the economy).

The specific types of multipliers, best used to estimate the total economic impact of a particular project, depends entirely on the type of project information available. The diagram on the opposing page helps determine the appropriate multipliers to use in a given situation.

Following are detailed descriptions of the multipliers presented in this report and examples of their use.

TABLE B1/C1

Tables B1 and C1 present **Commodity Intensity Ratios** for specific commodities (Small Level 43 commodities, Medium Level 93 commodities). These intensity ratios measure the total in-province impacts (sum of direct, indirect and induced impacts) on GDP at Factor Cost, labour income and employment. Commodity intensity ratios for GDP and labour income measure the total impact per dollar of Manitoba purchase, while those for employment measure the total employment impact per $10,000 of Manitoba purchase in 1991.

To estimate the total impact to GDP or labour income, simply multiply the value of commodity purchase in Manitoba by the appropriate intensity ratio. However, to estimate total employment impacts, the value of the commodity purchase must be divided by $10,000 before multiplying by the appropriate intensity ratio.

For example, the impacts to the Manitoba economy of a $150,000 increase in local demand for clothing (Commodity 35, Table C1) would be as follows:

The total increase in GDP at factor cost is estimated at $69,750 ($150,000 x 0.4650), while the total labour income impact is estimated at $54,390 ($150,000 x 0.3626). Total employment generated by this $150,000 increase in demand is estimated at 2.5 jobs (($150,000/$10,000) x 0.1673).

The total GDP impact and total labour income impact will be in the same units (i.e., dollars, millions of dollars, etc.) as the initial data. Total employment impacts are considered to be full-time equivalent jobs for a duration of one year, at 1991 wage levels.

It should be noted that the 1991 employment intensity ratios that have been provided, can be modified so as to obtain estimates of total employment for any year that may be of interest. This is true for all of the various employment intensity ratios presented in this report. Although there are a number of valid methods that can be used to adjust the 1991 employment multipliers, one of the most accessible is by using the average change in wage levels between the base year (1991) and the year of interest.

For example, assuming an average 9.5% increase in wage levels from 1991 to 1994 (i.e., 1994 wages = 1.095 x 1991 wages), then the employment intensity ratio for clothing (Commodity 35, Table C1) in 1994, per $10,000 of purchase, is 0.1528 (0.1673/1.095). Therefore, a $150,000 increase in local demand for clothing would result in an estimated 2.3 jobs (($150,000/$10,000) x 0.1528) in Manitoba, in 1994. Note this employment level is slightly lower than employment that would have resulted in 1991 (2.5 versus 2.3).

MULTIPLIERS: USE OF TABLES

INFORMATION AVAILABLE		USE TABLE	PROCEDURE
Dollar value of a change in demand for a Commodity in Manitoba.		B1 or C1	Locate appropriate commodity in table, and multiply dollar value of change in demand by intensity ratios presented.
Dollar value of a change in output of an Industry in Manitoba	Only have dollar value of change in output.	B2 or C2	Locate appropriate industry in table, and multiply dollar value of change in output by intensity ratios presented.
	Have detailed cost information, sufficient to calculate Direct GDP, Labour Income and Employment.	B3 or C3	Locate appropriate industry in table, and multiply the calculated direct components by the relevant multipliers presented.

TABLE B2/C2

Tables B2 and C2 present **Industry Intensity Ratios**, which are analogous to the intensity ratios presented in Tables B1 and C1 in function and use, except that these are from the perspective of industry and province of production, rather than commodity and province of purchase. Table B2 (Small Level) presents intensity ratios for 16 industry groups, while Table C2 (Medium Level) presents intensity ratios for 49 industry groups.

Assuming an $800,000 increase in output from Manitoba printing and publishing industries (Industry 19, Table C2), the total increase in GDP at factor cost is estimated at $629,760 ($800,000 x 0.7872), while the total labour income impact is estimated at $412,720 ($800,000 x 0.5159). Total employment generated by such an increase in output is estimated at 13.6 jobs (($800,000/$10,000) x 0.1700) at 1991 wage levels.

The user is able to modify the 1991 employment intensity ratios that have been provided, so as to obtain employment impacts for any year that may be of interest. This can be accomplished by "deflating" the intensity ratios by the average change in wage levels between the base year (1991) and the year of interest (i.e., for the above example, employment in 1994 would be estimated at 12.4 jobs (($800,000/$10,000) x 0.1700/1.095).

TABLE B3/C3

Tables B3 and C3 present **Traditional Industry Multipliers** for 13 (Small Level) and 46 (Medium Level) industry groups. Traditional multipliers differ from intensity ratios, in that instead of estimating the total change in economic measures based on a direct change in Manitoba production, they estimate the total change in GDP, labour income and employment based on the "known" direct change in each of these measures.

To make use of traditional multipliers one must first have estimates of the direct GDP at Factor Cost, direct labour income and direct employment levels that may result from the change in industrial production.

Direct GDP at Factor Cost is calculated as the sum of components which constitute operating surplus; wages, profits, interest, depreciation, etc. The direct labour income component is also calculated as the sum of wages and salaries, supplementary labour income (i.e., overtime and applicable benefits) and net income of unincorporated business. It should be remembered that the change in output of a firm is not (in almost all cases) what constitutes its direct contribution to either GDP or labour income. This implies that the multiplier is not simply applied to the change in output for an industry.

To estimate the total impact on Manitoba GDP at Factor Cost, the GDP multiplier for the appropriate industry is multiplied by the direct change in GDP at factor cost. Similarly, total labour income is estimated by multiplying the labour income multiplier for the appropriate industry by the direct change in labour income. As with intensity ratios, the resultant total impacts will be in the same units (i.e., dollars, millions of dollars, etc.) as the initial data.

The employment multipliers are expressed in terms of total employment per direct job in 1991. If direct change in employment levels is known, the estimated total employment impact is determined by multiplying the employment multiplier for the appropriate industry by the direct change in employment.

For example, if in 1991 a furniture manufacturer (Industry 17, Table C3) established itself in Manitoba and directly created 30 jobs through its operation. Total employment estimated to result from this operation is estimated at 44.1 jobs (30 x 1.4693); 30 direct and 14.1 indirect and induced. Conversely, if this type of Manitoba furniture manufacturer ceased operations in 1991, total Manitoba employment would decrease by an estimated 44.1 jobs.

Total employment levels do not necessarily translate to full-time equivalent jobs, but will reflect the definition of "job" used in the calculation of direct employment. That is, total employment impacts will be in the same units (i.e., full-time equivalent, seasonal, full-time and part-time, person-hours, etc.) as those used for direct employment impacts.

Again, the user is able to modify the 1991 employment multipliers that have been provided by "deflating" them by the average change in wage levels between the base year (1991) and any year that may be of interest.

It should be noted that the use of the traditional multipliers (Tables B3 and C3) is preferred to intensity ratio use (Tables B2 and C2). The intensity ratios assume an average contribution to direct GDP, labour income and employment resulting from a given change in output for each industry. In practice, a firm could vary substantially from the average; having a higher relative labour content or lower profit margins, etc. Therefore, greater accuracy can be obtained by incorporating knowledge of the direct impacts on GDP at factor cost, labour income and employment.

TABLE B4/C4

Tables B4 and C4 present the average Manitoba supply ratios for 43 (Small Level) and 93 (Medium Level) commodity types. The data indicates the proportion of each commodity that has typically been supplied by Manitoba producers, as compared to suppliers elsewhere in Canada or other parts of the world. This table also indicates the degree of "openness" of the Manitoba economy, and the degree to which there is a dependence on imports.

For example, of all the chemical products purchased in Manitoba (Commodity 66, Table C4), such as fertilizers or welding gases, on average 19.0% are supplied by Manitoba sources, 55.4% are from other Canadian sources and 25.6% are supplied from outside of Canada.

V. MULTIPLIERS: ILLUSTRATIVE USES

Multiplier analysis can be used to estimate which of two projects is of greater economic benefit to Manitoba. The specific choice of multipliers to be used (traditional multipliers, intensity ratios, commodity or industry based) depends entirely on the information available. As stated earlier, the traditional industry multipliers (Tables B3 and C3) are preferable to the industry intensity ratios (Tables B2 and C2) if there is sufficient information to determine the direct components of GDP, labour income or employment.

Data

Project 1: The 1991 cost of constructing a machinery manufacturing plant is estimated at $3.0 million, and a further $1.0 million will be spent on industrial machinery to operationalize the plant. Operations, commencing in 1992, will employ 9 persons full-time, and generate annual sales of $1.0 million with the following distribution of costs, in 1991 dollars:

Wages	$ 205,900
Interest	$22,100
Profits	$37,900
Depreciation	$13,000
Overhead	$30,000
Materials	$691,100
Total	$1,000,000

Project 2: A $1.0 million expansion in output, beginning in 1991, from an established Manitoba clothing manufacturer.

Analysis

Project 1 - Construction: Impacts of the $3.0 million construction phase will be estimated using the intensity ratios for Non-Residential Construction (Commodity 70, Table C1). The commodity table is used because plant construction is to be done by Manitoba contractors whose output, or commodity, is non-residential construction.

Similarly, impacts resulting from the $1.0 million purchase of industrial machinery will be estimated using the commodity intensity ratios for Other Industrial Machinery (Commodity 53, Table C1).

The economic impacts are calculated as follows:

	Commodity 70	Commodity 53	Total Effects
Purchase Value	$3,000,000	$1,000,000	$4,000,000
GDP Multiplier	0.6864	0.0842	
Total GDP	$2,059,200	$84,200	$2,143,400
Labour Income Multiplier	0.5369	0.0563	
Total Labour Income	$1,610,700	$56,300	$1,667,000
1991 Employment Multiplier	0.1487	0.0173	
Total Employment (Jobs)	44.6	1.7	46.3

Project 1 - Annual Operations: Impacts of operations, commencing in 1992, could be estimated using the industry intensity ratios for Machinery Manufacturers (Industry 22, Table C2), as follows:

		Industry 22 Multipliers	Total Effects
Change in Production	$1,000,000		
GDP at Factor Cost		0.5764	$576,400
Labour Income		0.4299	$429,900
1991 Employment (Jobs per $10,000)		0.1322	13.2

However, since detailed cost information has been provided, the traditional multipliers (Industry 22, Table C3) will be used to provide a better estimate of the total impact.

Direct GDP is calculated as the sum of Wages, Interest, Profits, Depreciation and Overhead (assumed to be rent); $308,900. Materials and other purchased inputs are not included in direct GDP, as they are purchased from other industries and will be reflected in the indirect effects.

Direct labour income is equal to the amount designated as Wages ($205,900), and direct jobs are also specified (9).

Impacts are calculated as follows:

	Direct Effects	Industry 22 Multipliers	Total Effects
Gross Output	$1,000,000		
GDP at Factor Cost	$308,900	1.6797	$518,859
Labour Income	$205,900	1.5647	$322,172
1991 Employment (Jobs)	9	1.6583	14.9

Project 2: Impacts of the proposed $1.0 million increase in clothing production in Manitoba must be estimated using intensity ratios for the clothing industry (Industry 15, Table C2), because no information exists from which to calculate the direct impacts of this increase.

Impacts are calculated as follows:

		Industry 15 Multipliers	Total Effects
Change in Production	$1,000,000		
GDP at Factor Cost		0.6585	$658,500
Labour Income		0.4789	$478,900
1991 Employment (Jobs per $10,000)		0.2212	22.1

Since the $1.0 million change in output (in 1991 dollars) is to be continued for a number of years, the 1991 results would be duplicated in 1992. For employment, this implies no change in wage levels. If wage levels are different in 1992, then employment would have to be adjusted as illustrated previously.

Comparison of Project Impacts

The final step is to compare the relative economic benefits of the two projects. The following is a summary of the total effects of the two projects, as estimated by multiplier analysis.

It is clear that Project 1 has the greater economic impact in 1991, due to the capital and labour intensive construction phase. However, over the long term Project 2 would produce larger economic benefits than Project 1. In 1992, and all subsequent years, Project 2 would yield greater impacts in all three economic measures assessed.

	1991	1992
GDP at Factor Cost		
Project 1	$2,143,400	$518,859
Project 2	$658,500	$658,500
Labour Income		
Project 1	$1,667,000	$322,172
Project 2	$478,900	$478,900
Employment (Jobs)		
Project 1	46.3	14.9
Project 2	22.1	22.1

Note that all above impacts are presented in 1991 dollars, including GDP, labour income and employment impacts for 1992. This is because the initial data for both projects is in 1991 dollars.

VI. MULTIPLIERS: COMMON USAGE PROBLEMS

Economic multipliers, being a relatively powerful and simple tool to use, are increasingly being incorporated into the decision making process. As a result, people who are unfamiliar with multipliers and their proper use are sometimes confronted by a problem which they attempt to solve with available data and a set of economic multipliers. This combination may result in reasonably good estimates of economic measures, or the results may be meaningless.

To achieve meaningful results through multiplier analysis there are two points to remember; (1) know your data, and (2) know your multipliers. Be aware of what they represent, and what their limitations are.

Some of the more common problems associated with improper use of multipliers are as follows:

1) Overestimating economic benefits

   - Double counting the direct effect by adding the value of direct expenditures to the multiplier result (i.e., Total Impact = Direct Expenditure + Direct Expenditure x Multiplier).

   - Using the wrong multiplier, such as using traditional multipliers instead of intensity ratios with expenditures data (i.e., 1.4897 instead of 0.6585 for the clothing industry GDP).

2) Using multipliers from some other study or for a different province, such as Ontario, where there can be different linkages between industries and self-supply ratios. This can lead to significant overestimating of impacts.

3) Estimation of impacts for a project which is not typical to available multipliers (i.e., project is far from average of the industry). As a result, impacts may be considerably over or understated.

4) Using wrong input data. For example, if capital costs of $3.0 million are further designated as $2.0 million for construction and $1.0 million for equipment, then recognize this distinction when applying the multipliers (ie. it is not $3.0 million for construction). Equipment multipliers for Manitoba are "lower" due to direct leakages.

5) Neglecting to adjust employment multipliers to produce estimates relevant to the base year of the original data, thereby overstating the employment impacts.

6) With reference to the Manitoba economy, multiplier analysis produces gross rather than net impacts. Consideration of the net impact is very important because estimated impacts may not occur.
   - i.e., building a new hotel may take business away from existing hotels rather than creating any new economic activity.
   - Home insulation upgrade programs can result in reduced demand for heating fuel, propane and electricity which will have a negative impact on economic activity.

APPENDIX – A

MBS Economic Impact Assessment & Provincial Taxation Models

MBS ECONOMIC IMPACT ASSESSMENT/PROVINCIAL TAXATION MODELS:

If the needs of a particular project exceed the capability of, or would prove too cumbersome for the tables provided in this report, MBS can produce detailed economic impact assessments on a cost recovery basis, using project expenditure data. These simulations will be run through the models which were used to generate the multipliers presented in this report, or the Worksheet Level Model. The worksheet level model allows for a greater level of detail (216 industries and 602 commodities) than either the Medium or Small Level models.

Some of the primary reasons for choosing the MBS Economic Impact Assessment Model option over the "Published Multipliers" option are:

1) Resultant impact estimates will be more accurate;

2) Detailed breakdown of impact estimates, in terms of the direct, indirect, and induced effects;

3) Income Account summary, and average wage rate information;

4) Impacts to individual industries can be determined;

5) Various parameters can be altered, including adjustments for changes in wage rates, specific industry or commodity price levels and Manitoba supply ratios to provide a "custom" simulation;

6) MBS Provincial Taxation Model can be used to estimate Manitoba tax impacts;

7) Elimination of possible "double counting" problems that may occur with multiplier use, when commodities or industries that may be related are treated separately;

8) Data exists in such detail that multiplier use may prove too cumbersome, and the "MBS Economic Assessment Model" would definitely enhance the quality of estimates.

If all that is known about the project is the overall cost, and the industry directly impacted, the MBS model will be accessed through the "Industry Option". However, if more detailed expenditure data is available it becomes possible to utilize the "Commodity Option", where inputs can be in Purchaser Prices, Producer Prices, or Final Demand. Final Demand is sensitive not only to the particular commodities purchased but also the source of demand (i.e., consumers, manufacturers, construction industries, government, inventories or trade considerations).

MBS is also able to produce estimates of total provincial tax revenues that may result from the project. The MBS Provincial Taxation Model produces estimates of individual and corporate income taxes, as well as other direct and indirect taxes, output from which can be user specified.

Questions or specific requests regarding the MBS Economic Impact Assessment Models or Provincial Taxation Model should be addressed to Wilf Falk at 945-2988.

The following example illustrates how the MBS Economic Impact Assessment Models can be used to determine the economic and taxation impacts of a particular project.

The economic and tax benefits to Manitoba, which may result from a $3.0 million upgrade to a municipal building, will be assessed both from the perspective of Industries and Commodities (Purchaser Prices), in order to highlight the difference between general (Industry) and specific (Commodity) information.

Industry Option:

There will be a $3.0 million upgrade to an existing building. The client has no further information, but wants to know how this project may impact the Manitoba economy. The MBS Economic Impact Assessment Model (Worksheet Level) is based on input values at the 602 commodities and 216 industries level.

Industry 153 is Repair Construction, which is determined to be most appropriate for this particular project. Therefore, $3.0 million is input to Repair Construction.

The resultant output is based only on this one value and the average flow patterns of goods, services, labour, profits, etc., for the repair construction industry. However, the true impacts of this project may differ greatly from average, as summarized in Table A1.

Commodity Option:

If detailed expenditures for the specific commodities used for this $3.0 million project are available, the first step is to take this data and apply the relevant commodity codes from the MBS Economic Impact Assessment Model that will be used; in this case the Medium Level (100 commodity) model.

Commodity	Expenditure	Commodity Code
Plastic Sheet & Pipes	$ 75,000	29
Lumber	170,000	36
Plywood	140,000	37
Millwork	140,000	38
Structural Steel	100,000	52
Hardware	60,000	52
Cement	150,000	60
Concrete Forms	170,000	60
Windows	70,000	61
Fuel Oil	50,000	62
Paint, Varnish & Sealer	200,000	67
Consultants	175,000	84
Labour Costs	1,500,000	97
Total Expenditures	$3,000,000	

After evaluating the proposed expenditures data in terms of commodities available to the MBS Model, data inputs are as follows:

Commodity Code	Description	Value
29	Plastic Fabricated Products	$ 75,000
36	Lumber & Timber	170,000
37	Veneer & Plywood	140,000
38	Other Wood Fabricated Material	140,000
52	Other Metal Fabricated Products	160,000
60	Cement & Concrete Products	320,000
61	Other Non-Metallic Mineral Products	70,000
62	Gasoline & Fuel Oil	50,000
67	Other Chemical Products	200,000
84	Business Services	175,000
97	Wages & Salaries	1,500,000
	Total	$3,000,000

An average annual wage of $43,000 for construction workers was estimated by the client, for the on-site labour costs of $1.5 million. This results in roughly 35 on-site construction jobs.

Summary Table Comparison:

When specific commodity expenditures data is incorporated into the assessment, the project turns out to be much more labour intensive than the average repair construction project; yielding an additional $400,000 in labour income and an additional 13 direct jobs.

Furthermore, the commodity specific assessment estimates $325,000 in Total Provincial Taxes including $120,000 in Individual Income Taxes, whereas repair construction worth $3.0 million would typically be expected to produce $269,000 in Total Provincial Taxes and $96,000 in Individual Income Taxes.

TABLE A1: SUMMARY, MBS MODELS' EXAMPLES

TOTAL MANITOBA ECONOMIC IMPACTS

$ THOUSANDS

Building Upgrade	General Industry	Detailed Commodity
Direct Manitoba Expenditures	3,000	3,000
Gross Production	6,266	5,538
GDP at Market Prices	2,529	2,754
GDP at Factor Cost	2,257	2,541
Labour Income	1,798	2,198
Employment (Person Years)		
Direct Jobs	28	41
Non-Direct Jobs	21	19
Total Jobs	49	60

Notes: (1) GDP at Market Prices is the total value of goods and services produced in the Manitoba economy.

(2) GDP at Factor Cost is the total value of goods and services produced by Manitoba industries (ie. GDP at Market Prices less indirect taxes plus subsidies).

TOTAL PROVINCIAL TAXATION IMPACTS

$ THOUSANDS

Building Upgrade	General Industry	Detailed Commodity
Income Taxes		
Individuals	96	120
Corporations	11	12
Other Direct Taxes	112	135
Indirect Taxes	50	59
Total Provincial Taxes	269	325

Notes: (1) Other Direct Taxes includes Retail Sales Tax, Gasoline Tax, Revenue Act 1964, Tobacco Tax and MLCC Revenue.

(2) Indirect Taxes includes Insurance Corporation Tax, Land Transfer Tax, Corporation Capital Tax, Motive Fuel Tax and the Health and Education Levy.

Data Source: Manitoba Bureau of Statistics
Economic Impact Assessment Model
Provincial Taxation Model

TABLE A2: ECONOMIC IMPACT SUMMARY, MBS MODEL OUTPUT
$3.0 Million Repair Construction – General Industry

Impact Estimates	GDP at Factor Cost ($)	Labour Income ($)	Employment 1992 (number)	Gross Production ($)
Directly Input	0	0	0	0
Other Direct	1,407,029	1,227,590	28	3,000,000
Total Direct	1,407,029	1,227,590	28	3,000,000
Indirect	267,203	183,485	6	601,100
Total Open	1,674,232	1,411,075	34	3,601,100
Induced	582,715	387,387	15	2,665,197
Total Closed	2,256,947	1,798,462	49	6,266,297

Multipliers	Total GDP per $ of Direct GDP	Total Labour Income per Dollar of Direct Labour Income	Total Employment per Direct Job in 1992	Total Production per Dollar of Direct Production
Open Model	1.1899	1.1495	1.2254	1.2004
Closed Model	1.6041	1.465	1.7481	2.0888

Intensity Ratios	Total GDP per Dollar of Production	Total Labour Income per Dollar of Production	Total Employment per $10,000 of Production in 1992
Open Model	0.55808	0.47036	0.1144
Closed Model	0.75232	0.59949	0.1632

Income Account Summary	Total Direct ($)	Total Open ($)	Total Closed ($)
Government Goods and Services	349,105	349,645	353,650
Commodity Indirect Taxes	108,097	114,618	213,663
Subsidies	-1,530	-11,469	-34,953
Other Indirect Taxes	25,099	37,630	93,552
Wages & Salaries	1,027,219	1,186,801	1,472,846
Supplementary Labour Income	77,324	90,869	112,926
Net Income of Unincorporated Business	123,047	133,405	212,691
Other Operating Surplus	179,439	263,157	458,484
Total GDP at Market Prices	1,538,696	1,815,011	2,529,209

Data Source: MBS Economic Impact Assessment Model (Worksheet Level), Industry Option

TABLE A3: ECONOMIC IMPACT SUMMARY, MBS MODEL OUTPUT
$3.0 Million Repair Construction – Detailed Commodity

Impact Estimates	GDP at Factor Cost ($)	Labour Income ($)	Employment 1992 (number)	Gross Production ($)
Directly Input	1,500,000	1,500,000	35	1,500,000
Other Direct	243,752	176,728	6	559,281
Total Direct	1,743,752	1,676,728	41	2,059,281
Indirect	96,742	60,072	2	228,702
Total Open	1,840,494	1,736,800	43	2,287,983
Induced	700,186	461,690	17	3,250,219
Total Closed	2,540,680	2,198,490	60	5,538,202

Multipliers	Total GDP per Dollar of Direct GDP	Total Labour Income per Dollar of Direct Labour Income	Total Employment per Direct Job in 1992	Total Production per Dollar of Direct Production
Open Model	1.0555	1.0358	1.0464	1.1111
Closed Model	1.457	1.3112	1.4721	2.6894

Intensity Ratios	Total GDP per Dollar of Production	Total Labour Income per Dollar of Production	Total Employment per $10,000 of Production in 1992
Open Model	0.6135	0.57893	0.14167
Closed Model	0.84689	0.73283	0.19931

Income Account Summary	Total Direct ($)	Total Open ($)	Total Closed ($)
Indirect Taxes	44,510	52,248	241,825
Subsidies	-1,323	-4,366	-28,479
Wages & Salaries	1,653,254	1,704,308	2,044,143
Supplementary Labour Income	13,308	17,968	44,273
Net Income of Unincorporated Business	10,166	14,525	110,074
Other Operating Surplus	67,024	103,694	342,190
Total GDP at Market Prices	1,786,939	1,888,375	2,754,025

Data Source: MBS Economic Impact Assessment Model (Medium Level), Commodity Option (Purchaser Prices)

TABLE A4: GDP AT MARKET PRICES, FOR SELECTED INDUSTRIES

INDUSTRY	RATIO OF GDP AT MARKET PRICES TO FACTOR COST	GDP AT MARKET PRICES IMPACT COMPOSITION			
		DIRECT	INDIRECT	INDUCED	TOTAL
1 AGRICULTURAL & RELATED	1.025	0.555	0.250	0.195	1.000
8 FOOD MANUFACTURING	1.050	0.295	0.470	0.235	1.000
15 CLOTHING	1.065	0.637	0.094	0.269	1.000
22 MACHINERY	1.089	0.572	0.158	0.270	1.000
29 CONSTRUCTION	1.155	0.560	0.184	0.257	1.000
30 TRANSPORTATION	0.999	0.586	0.134	0.280	1.000
34 OTHER UTILITIES	1.022	0.835	0.032	0.133	1.000
36 RETAIL TRADE	1.094	0.616	0.096	0.289	1.000
42 HEALTH SERVICES	1.086	0.588	0.073	0.339	1.000
45 PERSONAL & HOUSEHOLD SERVICES	1.090	0.649	0.057	0.294	1.000

(1) GDP at Factor Cost is the total value of goods and services produced by Manitoba industries.

(2) GDP at Market Prices is the total value of goods and services produced by the Manitoba economy, and is equal to GDP at Factor Cost plus indirect taxes minus subsidies.

(3) The ratio of GDP at Market Prices to GDP at Factor Cost shows the degree of impact of indirect taxes and subsidies. A ratio of 1.025 for a particular industry, indicates that GDP at Market Prices is 2.5% greater on average than GDP at Factor Cost. A ratio of less than 1.000 (such as in the Transportation Industry) indicates that on average subsidies exceed indirect taxes.

Data Source: Manitoba Bureau of Statistics
Economic Impact Assessment Model (Medium Level)

APPENDIX – B

Economic Multipliers
Small Level

TABLE B1: MANITOBA COMMODITY INTENSITY RATIOS

COMMODITY	GDP FACTOR COST PER DOLLAR PURCHASED	LABOUR INCOME PER DOLLAR PURCHASED	EMPLOYMENT PER $10,000 IN 1981 PURCHASES
1 GRAINS	0.4985	0.2628	0.1419
2 OTHER AGRICULTURAL PRODUCTS	0.5022	0.2696	0.1467
3 FORESTRY PRODUCTS	0.7219	0.5970	0.2221
4 FISHING & TRAPPING PRODUCTS	0.3284	0.2613	0.0540
5 METALLIC ORES & CONCENTRATES	0.7068	0.3301	0.0861
6 MINERAL FUELS	0.0868	0.0402	0.0113
7 NON-METALLIC MINERALS	0.4904	0.2454	0.0689
8 SERVICES INCIDENTAL TO MINING	0.3846	0.1793	0.0467
9 MEAT, FISH & DAIRY PRODUCTS	0.5104	0.3476	0.1342
10 FRUIT & VEGETABLE FOODS & FEED	0.3403	0.2385	0.0920
11 BEVERAGES	0.1979	0.1455	0.0601
12 TOBACCO & TOBACCO PRODUCTS	0.3481	0.2556	0.1057
13 RUBBER, LEATHER & PLASTIC PRODUCTS	0.1648	0.1199	0.0477
14 TEXTILE PRODUCTS	0.1286	0.0964	0.0393
15 KNITTED PRODUCTS & CLOTHING	0.4385	0.3387	0.1510
16 LUMBER, SAWMILL & WOOD PRODUCTS	0.2378	0.1610	0.0545
17 FURNITURE & FIXTURES	0.3770	0.2713	0.1104
18 PAPER & PAPER PRODUCTS	0.2097	0.1425	0.0517
19 PRINTING & PUBLISHING	0.3953	0.2602	0.0940
20 PRIMARY METAL PRODUCTS	0.0866	0.0566	0.0193
21 FABRICATED METAL PRODUCTS	0.2127	0.1425	0.0498
22 MACHINERY & EQUIPMENT	0.1095	0.0744	0.0253
23 VEHICLES & TRANSPORTION EQUIPMENT	0.0814	0.0547	0.0197
24 ELECTRICAL & ELECTRONIC PRODUCTS	0.1171	0.0849	0.0315
25 NON-METALLIC MINERAL PRODUCTS	0.3749	0.2470	0.0876
26 PETROLEUM & COAL PRODUCTS	0.0748	0.0560	0.0203
27 CHEMICALS & CHEMICAL PRODUCTS	0.1980	0.1372	0.0541
28 MISCELLANEOUS PRODUCTS	0.1708	0.1289	0.0537
29 CONSTRUCTION	0.6662	0.5045	0.1438
30 TRANSPORTATION & STORAGE	0.2678	0.1839	0.0568
31 COMMUNICATION SERVICES	0.9606	0.6302	0.1818
32 OTHER UTILITIES	0.8818	0.3058	0.0802
33 WHOLESALE MARGINS	0.4794	0.3523	0.0985
34 RETAIL MARGINS	1.0359	0.8329	0.3925
35 RENT, OWNER OCCUPIED DWELLINGS	0.9035	0.4748	0.0970
36 FINANCE, INSURANCE & REAL ESTATE	0.3757	0.2001	0.0425
37 BUSINESS SERVICES	0.3482	0.2680	0.1080
38 PERSONAL & MISCELLANEOUS SERVICES	0.7748	0.5939	0.2392
39 TRANSPORTATION MARGINS	0.0535	0.0368	0.0114
40 MISCELLANEOUS OPERATING SUPPLIES	0.2759	0.1926	0.0700
41 TRAVEL, ADVERTISING & PROMOTION	0.3786	0.2709	0.0989
42 LABOUR INCOME	1.4064	1.2800	0.1071
43 NET INCOME UNINCORP. BUSINESS	1.4064	1.2800	0.1071

Data Source: Manitoba Bureau of Statistics
Economic Impact Assessment Model (Small Level)

TABLE B2: MANITOBA INDUSTRY INTENSITY RATIOS

	INDUSTRY	GDP FACTOR COST PER DOLLAR OF PRODUCTION	LABOUR INCOME PER DOLLAR OF PRODUCTION	EMPLOYMENT PER $10,000 OF 1991 PRODUCTION
1	AGRICULTURE & RELATED	0.6647	0.3404	0.1933
2	FISHING & TRAPPING	0.9032	0.7233	0.1373
3	LOGGING & FORESTRY	0.8049	0.6967	0.2527
4	MINING, QUARRYING & DRILLING	0.8224	0.3834	0.0999
5	MANUFACTURING	0.6471	0.4151	0.1463
6	CONSTRUCTION	0.6662	0.5045	0.1438
7	TRANSPORTATION & STORAGE	0.9132	0.6269	0.1933
8	COMMUNICATIONS	1.1138	0.7305	0.2107
9	OTHER UTILITIES	1.0544	0.3657	0.0958
10	WHOLESALE TRADE	1.0653	0.7873	0.2178
11	RETAIL TRADE	1.0363	0.8363	0.3952
12	FINANCE, INSURANCE & REAL ESTATE	0.9035	0.4748	0.0970
13	OTHER SERVICES	1.0049	0.7817	0.3196
14	MISCELLANEOUS OPERATING SUPPLIES	0.2759	0.1926	0.0700
15	TRAVEL, ADVERTISING & PROMOTION	0.4768	0.3412	0.1245
16	TRANSPORTATION MARGINS	0.2696	0.1851	0.0571

Data Source: Manitoba Bureau of Statistics
Economic Impact Assessment Model (Small Level)

TABLE B3: MANITOBA TRADITIONAL INDUSTRY MULTIPLIERS

	INDUSTRY	GDP FACTOR COST PER DOLLAR OF DIRECT GDP	LABOUR INCOME PER DOLLAR OF DIRECT LABOUR INCOME	TOTAL EMPLOYMENT PER 1991 DIRECT JOB
1	AGRICULTURE & RELATED	1.6818	1.9307	1.5274
2	FISHING & TRAPPING	1.4248	1.3468	2.0196
3	LOGGING & FORESTRY	2.1338	1.8184	1.8222
4	MINING, QUARRYING & DRILLING	1.3771	1.5949	1.9462
5	MANUFACTURING	1.9699	1.8785	2.0328
6	CONSTRUCTION	1.7707	1.6536	2.0352
7	TRANSPORTATION & STORAGE	1.5330	1.5373	1.6749
8	COMMUNICATIONS	1.4365	1.4630	1.6671
9	OTHER UTILITIES	1.1632	1.3811	1.6026
10	WHOLESALE TRADE	1.4380	1.3865	1.5807
11	RETAIL TRADE	1.5524	1.4068	1.2820
12	FINANCE, INSURANCE & REAL ESTATE	1.3577	1.5008	2.3001
13	OTHER SERVICES	1.5671	1.4542	1.3879

Data Source: Manitoba Bureau of Statistics
Economic Impact Assessment Model (Small Level)

TABLE B4: 1984 MANITOBA COMMODITY SUPPLY RATIOS

	COMMODITY	MANITOBA	OTHER CANADA	REST OF THE WORLD
1	GRAINS	0.8909	0.0231	0.0860
2	OTHER AGRICULTURAL PRODUCTS	0.7597	0.1954	0.0449
3	FORESTRY PRODUCTS	0.9564	0.0406	0.0030
4	FISHING & TRAPPING PRODUCTS	0.3531	0.5661	0.0808
5	METALLIC ORES & CONCENTRATES	0.9233	0.0747	0.0020
6	MINERAL FUELS	0.0423	0.9572	0.0005
7	NON-METALLIC MINERALS	0.7108	0.1453	0.1439
8	SERVICES INCIDENTAL TO MINING	0.4680	0.5320	0.0000
9	MEAT, FISH & DAIRY PRODUCTS	0.7016	0.2323	0.0661
10	FRUIT & VEGETABLE FOODS & FEED	0.3799	0.4924	0.1277
11	BEVERAGES	0.5542	0.3269	0.1189
12	TOBACCO & TOBACCO PRODUCTS	0.0000	0.9392	0.0608
13	RUBBER, LEATHER & PLASTIC PRODUCTS	0.1677	0.5136	0.3188
14	TEXTILE PRODUCTS	0.0669	0.5314	0.4017
15	KNITTED PRODUCTS & CLOTHING	0.2022	0.5059	0.2919
16	LUMBER, SAWMILL & WOOD PRODUCTS	0.3252	0.5709	0.1039
17	FURNITURE & FIXTURES	0.3985	0.5063	0.0952
18	PAPER & PAPER PRODUCTS	0.2704	0.5804	0.1492
19	PRINTING & PUBLISHING	0.6057	0.2191	0.1753
20	PRIMARY METAL PRODUCTS	0.1410	0.7003	0.1586
21	FABRICATED METAL PRODUCTS	0.3184	0.4576	0.2240
22	MACHINERY & EQUIPMENT	0.1067	0.1319	0.7614
23	VEHICLES & TRANSPORTION EQUIPMENT	0.1313	0.1901	0.6786
24	ELECTRICAL & ELECTRONIC PRODUCTS	0.0926	0.4427	0.4647
25	NON-METALLIC MINERAL PRODUCTS	0.5852	0.2380	0.1768
26	PETROLEUM & COAL PRODUCTS	0.0274	0.9463	0.0264
27	CHEMICALS & CHEMICAL PRODUCTS	0.2227	0.5441	0.2332
28	MISCELLANEOUS PRODUCTS	0.0916	0.4445	0.4639
29	CONSTRUCTION	1.0000	0.0000	0.0000
30	TRANSPORTATION & STORAGE	0.2989	0.6507	0.0504
31	COMMUNICATION SERVICES	0.8967	0.0949	0.0085
32	OTHER UTILITIES	0.9580	0.0420	0.0000
33	WHOLESALE MARGINS	0.4629	0.5251	0.0121
34	RETAIL MARGINS	1.0000	0.0000	0.0000
35	RENT, OWNER OCCUPIED DWELLINGS	1.0000	0.0000	0.0000
36	FINANCE, INSURANCE & REAL ESTATE	0.4391	0.5527	0.0082
37	BUSINESS SERVICES	0.3882	0.4983	0.1135
38	PERSONAL & MISCELLANEOUS SERVICES	0.8577	0.1257	0.0165
39	TRANSPORTATION MARGINS	0.1986	0.8014	0.0000
40	MISCELLANEOUS OPERATING SUPPLIES	1.0000	0.0000	0.0000
41	TRAVEL, ADVERTISING & PROMOTION	0.7941	0.2059	0.0000
42	LABOUR INCOME	1.0000	0.0000	0.0000
43	NET INCOME UNINCORP. BUSINESS	1.0000	0.0000	0.0000

Data Source: Manitoba Bureau of Statistics
Economic Impact Assessment Model (Small Level)

APPENDIX – C

Economic Multipliers
Medium Level

TABLE C1: MANITOBA COMMODITY INTENSITY RATIOS

	COMMODITY	GDP FACTOR COST PER DOLLAR PURCHASED	LABOUR INCOME PER DOLLAR PURCHASED	EMPLOYMENT PER $10,000 IN 1981 PURCHASES
1	GRAINS	0.5036	0.2630	0.1431
2	LIVE ANIMALS	0.5204	0.2667	0.1501
3	OTHER AGRICULTURAL PRODUCTS	0.5027	0.2742	0.1474
4	FORESTRY PRODUCTS	0.7121	0.5884	0.2188
5	FISH LANDINGS	0.3548	0.2794	0.0573
6	HUNTING & TRAPPING PRODUCTS	0.0251	0.0198	0.0038
7	IRON ORES & CONCENTRATES	0.0045	0.0032	0.0010
8	OTHER ORES & CONCENTRATES	0.7568	0.4137	0.1021
9	COAL	0.0082	0.0059	0.0018
10	CRUDE MINERAL PRODUCTS	0.1964	0.0306	0.0085
11	NATURAL GAS	0.2099	0.0490	0.0116
12	NON-METALLIC MINERALS	0.4748	0.2709	0.0630
13	SERVICES INCIDENTAL TO MINING	0.3799	0.2394	0.0686
14	MEAT PRODUCTS	0.4601	0.3101	0.1328
15	DAIRY PRODUCTS	0.5472	0.3683	0.1552
16	FISH PRODUCTS	0.0822	0.0580	0.0235
17	FRUIT & VEGETABLE PREPARATIONS	0.2374	0.1795	0.0774
18	FEEDS	0.3860	0.2481	0.0989
19	FLOUR, WHEAT & OTHER CEREAL	0.1965	0.1364	0.0544
20	CEREAL & BAKERY PRODUCTS	0.4408	0.3241	0.1442
21	SUGAR	0.4190	0.2851	0.1140
22	MISC. FOOD PRODUCTS	0.2575	0.1803	0.0746
23	SOFT DRINKS	0.5584	0.3468	0.1224
24	ALCOHOLIC BEVERAGES	0.2680	0.1714	0.0647
25	TOBACCO, UNMANUFACTED	0.0000	0.0000	0.0000
26	TOBACCO PRODUCTS	0.2118	0.1669	0.0743
27	TIRES & TUBES	0.1170	0.0902	0.0362
28	OTHER RUBBER PRODUCTS	0.1467	0.1263	0.0439
29	PLASTIC FABRICATED PRODUCTS	0.1370	0.0833	0.0299
30	LEATHER & LEATHER PRODUCTS	0.2798	0.2142	0.0920
31	YARNS & MAN-MADE FIBRES	0.1100	0.0864	0.0374
32	FABRICS	0.0679	0.0684	0.0284
33	OTHER TEXTILE PRODUCTS	0.1701	0.1331	0.0571
34	HOSIERY & KNITTED WEAR	0.3511	0.2782	0.1287
35	CLOTHING & ACCESSORIES	0.4650	0.3626	0.1673
36	LUMBER & TIMBER	0.0738	0.0544	0.0164
37	VENEER & PLYWOOD	0.0884	0.0657	0.0213
38	OTHER WOOD PRODUCTS	0.3800	0.2891	0.1013
39	FURNITURE & FIXTURES	0.3727	0.2804	0.1195
40	PULP	0.0893	0.0572	0.0173
41	NEWSPRINT & PAPER STOCK	0.1269	0.0837	0.0253
42	PAPER PRODUCTS	0.2688	0.1806	0.0631
43	PRINTING & PUBLISHING	0.4120	0.2772	0.0953
44	ADVERTISING, PRINT MEDIA	0.7010	0.4594	0.1514
45	IRON & STEEL PRODUCTS	0.1217	0.0771	0.0210
46	ALUMINUM PRODUCTS	0.1235	0.0745	0.0194
47	COPPER & ALLOY PRODUCTS	0.2145	0.1278	0.0332

Data Source: Manitoba Bureau of Statistics
Economic Impact Assessment Model (Medium Level)

TABLE C1 (Cont.): MANITOBA COMMODITY INTENSITY RATIOS

	COMMODITY	GDP FACTOR COST PER DOLLAR PURCHASED	LABOUR INCOME PER DOLLAR PURCHASED	EMPLOYMENT PER $10,000 IN 1991 PURCHASES
48	NICKEL PRODUCTS	0.0799	0.0471	0.0122
49	BOILERS, TANKS & PLATES	0.2053	0.1481	0.0472
50	FABRICATED STRUCTURAL METAL	0.4245	0.2927	0.0916
51	OTHER FABRICATED METAL PRODUCTS	0.1542	0.1089	0.0365
52	AGRICULTURAL MACHINERY	0.1070	0.0800	0.0258
53	OTHER INDUSTRIAL MACHINERY	0.0842	0.0563	0.0173
54	MOTOR VEHICLES	0.0432	0.0308	0.0111
55	MOTOR VEHICLE PARTS	0.1773	0.1205	0.0388
56	OTHER TRANSPORTION EQUIPMENT	0.1796	0.1211	0.0389
57	HOUSEHOLD APPLIANCES & RECEIVERS	0.1361	0.1054	0.0444
58	OTHER ELECTRICAL PRODUCTS	0.1252	0.0767	0.0257
59	CEMENT & CONCRETE PRODUCTS	0.6488	0.4107	0.1265
60	NON-METALLIC MINERAL PRODUCTS	0.2101	0.1374	0.0475
61	GASOLINE & FUEL OIL	0.0682	0.0500	0.0179
62	OTHER PETROLEUM & COAL PRODUCTS	0.1311	0.0788	0.0287
63	INDUSTRIAL CHEMICALS	0.1273	0.0723	0.0219
64	FERTILIZERS	0.2455	0.1330	0.0691
65	PHARMACEUTICALS	0.3227	0.2440	0.1054
66	OTHER CHEMICAL PRODUCTS	0.1838	0.1279	0.0490
67	SCIENTIFIC EQUIPMENT	0.1155	0.0900	0.0366
68	OTHER MANUFACTURED PRODUCTS	0.2270	0.1762	0.0737
69	RESIDENTIAL CONSTRUCTION	0.5659	0.4126	0.1174
70	NON-RESIDENTIAL CONSTRUCTION	0.6864	0.5369	0.1487
71	REPAIR CONSTRUCTION	0.7523	0.5995	0.1632
72	PIPELINE TRANSPORTATION	0.7742	0.1486	0.0331
73	TRANSPORTATION & STORAGE	0.2276	0.1604	0.0493
74	RADIO & TELEVISION BROADCASTING	1.0746	0.6958	0.1990
75	TELEPHONE & TELEGRAPH SERVICES	0.9010	0.5834	0.1669
76	POSTAL SERVICES	1.1116	0.7197	0.2058
77	ELECTRIC POWER	1.0240	0.3526	0.0916
78	OTHER UTILITIES	0.4225	0.1454	0.0378
79	WHOLESALE MARGINS	0.4780	0.3486	0.0970
80	RETAIL MARGINS	1.0363	0.8267	0.3895
81	RENT, OWNER OCCUPIED DWELLINGS	0.9133	0.3733	0.0362
82	FINANCE, INSURANCE & REAL ESTATE	0.3702	0.2313	0.0614
83	BUSINESS SERVICES	0.3452	0.2746	0.0984
84	EDUCATION SERVICES	0.4178	0.3387	0.0948
85	HEALTH SERVICES	0.8359	0.7815	0.1523
86	AMUSEMMENT & RECREATION SERVICES	0.6599	0.4258	0.1943
87	ACCOMMODATION & FOOD SERVICES	0.8831	0.5846	0.2661
88	OTHER MISCELLANEOUS SERVICES	0.6984	0.5191	0.2168
89	TRANSPORTATION MARGINS	0.0455	0.0321	0.0099
90	MISCELLANEOUS OPERATING SUPPLIES	0.2700	0.1872	0.0674
91	TRAVEL, ADVERTISING & PROMOTION	0.4348	0.2931	0.1096
92	LABOUR INCOME	1.4032	1.2658	0.0996
93	NET INCOME UNINCORP. BUSINESS	1.4032	1.2658	0.0996

Data Source: Manitoba Bureau of Statistics
Economic Impact Assessment Model (Medium Level)

TABLE C2: MANITOBA INDUSTRY INTENSITY RATIOS

INDUSTRY	GDP FACTOR COST PER DOLLAR OF PRODUCTION	LABOUR INCOME PER DOLLAR OF PRODUCTION	EMPLOYMENT PER $10,000 OF 1981 PRODUCTION
1 AGRICULTURAL & RELATED	0.6760	0.3432	0.1958
2 FISHING & TRAPPING	0.9052	0.7175	0.1338
3 LOGGING & FORESTRY	0.7898	0.6823	0.2471
4 MINING	0.8810	0.4812	0.1187
5 CRUDE PETROLEUM & NATURAL GAS	0.7086	0.1079	0.0305
6 QUARRY & SAND PIT	0.7387	0.4051	0.1334
7 MINERAL EXTRACTION RELATED	0.8122	0.5118	0.1467
8 FOOD MANUFACTURING	0.5843	0.3670	0.1506
9 BEVERAGE	0.6759	0.3744	0.1162
10 TOBACCO PRODUCTS	0.0000	0.0000	0.0000
11 RUBBER PRODUCTS	0.5173	0.5693	0.1636
12 PLASTIC PRODUCTS	0.5744	0.3019	0.1054
13 LEATHER & ALLIED PRODUCTS	0.6435	0.4594	0.1661
14 PRIMARY TEXTILE PRODUCTS	0.5432	0.4319	0.1887
15 CLOTHING	0.6585	0.4789	0.2212
16 WOOD	0.7072	0.5417	0.1930
17 FURNITURE & FIXTURES	0.6274	0.4489	0.1812
18 PAPER & ALLIED PRODUCTS	0.6510	0.4128	0.1251
19 PRINTING & PUBLISHING	0.7872	0.5159	0.1700
20 PRIMARY METALS	0.7214	0.4233	0.1090
21 FABRICATED METAL PRODUCTS	0.6729	0.4834	0.1589
22 MACHINERY	0.5764	0.4299	0.1322
23 TRANSPORTATION EQUIPMENT	0.7203	0.4775	0.1514
24 ELECTRICAL & ELECTRONIC	0.7198	0.3348	0.1108
25 NON-METALLIC MINERALS	0.7311	0.4601	0.1420
26 REFINED PETROL & COAL PRODUCTS	0.5912	0.1979	0.0550
27 CHEMICAL PRODUCTS	0.5686	0.2842	0.0899
28 OTHER MANUFACTURING	0.7883	0.6135	0.2241
29 CONSTRUCTION	0.6764	0.5092	0.1431
30 TRANSPORTATION	0.9239	0.6563	0.1949
31 PIPELINE TRANSPORTATION	0.8260	0.1586	0.0353
32 STORAGE & WAREHOUSING	0.8674	0.5767	0.2173
33 COMMUNICATIONS	1.1121	0.7201	0.2059
34 OTHER UTILITIES	1.0538	0.3628	0.0943
35 WHOLESALE TRADE	1.0629	0.7798	0.2140
36 RETAIL TRADE	1.0371	0.8311	0.3923
37 FINANCE & REAL ESTATE	0.9066	0.5386	0.1417
38 INSURANCE	0.7812	0.7437	0.1879
39 OWNER OCCUPIED DWELLINGS	0.9133	0.3733	0.0362
40 BUSINESS SERVICES	0.9954	0.8064	0.2899
41 EDUCATION SERVICES	0.9726	0.7884	0.2206
42 HEALTH SERVICES	1.1705	1.0944	0.2133
43 ACCOMMODATION & FOOD SERVICES	0.8877	0.5843	0.2661
44 AMUSEMENT & RECREATION SERVICES	1.0247	0.6610	0.3034
45 PERSONAL & HOUSEHOLD SERVICES	1.0699	0.8881	0.4169
46 OTHER SERVICES	0.9643	0.6780	0.3153
47 MISCELLANEOUS OPERATING SUPPLIES	0.2700	0.1872	0.0674
48 TRAVEL, ADVERTISING & PROMOTION	0.5475	0.3691	0.1381
49 TRANSPORTATION MARGINS	0.2292	0.1615	0.0496

Data Source: Manitoba Bureau of Statistics
Economic Impact Assessment Model (Medium Level)

TABLE C3: MANITOBA TRADITIONAL INDUSTRY MULTIPLIERS

	INDUSTRY	GDP FACTOR COST PER DOLLAR OF DIRECT GDP	LABOUR INCOME PER DOLLAR OF DIRECT LABOUR INCOME	TOTAL EMPLOYMENT PER 1981 DIRECT JOB
1	AGRICULTURAL & RELATED	1.7103	1.9469	1.5476
2	FISHING & TRAPPING	1.4281	1.3361	1.9676
3	LOGGING & FORESTRY	2.0938	1.7808	1.7818
4	MINING	1.3953	1.4934	1.8521
5	CRUDE PETROLEUM & NATURAL GAS	1.2545	6.5117	7.8196
6	QUARRY & SAND PIT	1.5198	1.6841	1.7539
7	MINERAL EXTRACTION RELATED	1.4947	1.5260	1.7657
8	FOOD MANUFACTURING	3.2952	2.6680	3.5975
9	BEVERAGE	1.6423	1.7796	2.0426
10	TOBACCO PRODUCTS	0.0000	0.0000	0.0000
11	RUBBER PRODUCTS	2.4850	1.5127	1.7429
12	PLASTIC PRODUCTS	1.4835	1.6215	1.6165
13	LEATHER & ALLIED PRODUCTS	1.8996	1.7621	1.7736
14	PRIMARY TEXTILE PRODUCTS	1.6511	1.4953	1.3746
15	CLOTHING	1.4897	1.4344	1.3101
16	WOOD	1.9001	1.7872	1.7764
17	FURNITURE & FIXTURES	1.6523	1.5918	1.4693
18	PAPER & ALLIED PRODUCTS	1.8629	1.9813	2.3678
19	PRINTING & PUBLISHING	1.4989	1.4991	1.5429
20	PRIMARY METALS	4.0118	3.4219	3.8180
21	FABRICATED METAL PRODUCTS	1.6128	1.5289	1.5607
22	MACHINERY	1.6797	1.5647	1.6583
23	TRANSPORTATION EQUIPMENT	1.5005	1.4908	1.5629
24	ELECTRICAL & ELECTRONIC	1.3203	1.5026	1.5390
25	NON-METALLIC MINERALS	1.9952	1.9700	2.1438
26	REFINED PETROL & COAL PRODUCTS	3.0345	2.3424	2.7889
27	CHEMICAL PRODUCTS	1.8232	1.9896	2.1844
28	OTHER MANUFACTURING	1.5835	1.4501	1.4272
29	CONSTRUCTION	1.7981	1.6693	2.0254
30	TRANSPORTATION	1.5528	1.5117	1.6739
31	PIPELINE TRANSPORTATION	1.2207	1.5675	2.0478
32	STORAGE & WAREHOUSING	1.5298	1.5175	1.4615
33	COMMUNICATIONS	1.4343	1.4420	1.6293
34	OTHER UTILITIES	1.1626	1.3703	1.5767
35	WHOLESALE TRADE	1.4348	1.3733	1.5528
36	RETAIL TRADE	1.5537	1.3982	1.2728
37	FINANCE & REAL ESTATE	1.4905	1.5559	1.8586
38	INSURANCE	2.0493	1.5489	1.8768
39	OWNER OCCUPIED DWELLINGS	1.2013	1.3898	0.0000
40	BUSINESS SERVICES	1.6204	1.4616	1.4557
41	EDUCATION SERVICES	1.7241	1.4962	1.7033
42	HEALTH SERVICES	1.6025	1.3628	1.9821
43	ACCOMMODATION & FOOD SERVICES	1.5532	1.5209	1.3824
44	AMUSEMENT & RECREATION SERVICES	1.5105	1.5347	1.4144
45	PERSONAL & HOUSEHOLD SERVICES	1.4703	1.3437	1.2490
46	OTHER SERVICES	1.4246	1.3919	1.2805

Data Source: Manitoba Bureau of Statistics
Economic Impact Assessment Model (Medium Level)

TABLE C4: 1984 MANITOBA COMMODITY SUPPLY RATIOS

	COMMODITY	MANITOBA	OTHER CANADA	REST OF THE WORLD
1	GRAINS	0.8909	0.0231	0.0860
2	LIVE ANIMALS	0.7837	0.2101	0.0062
3	OTHER AGRICULTURAL PRODUCTS	0.7435	0.1854	0.0711
4	FORESTRY PRODUCTS	0.9564	0.0406	0.0030
5	FISH LANDINGS	0.3806	0.6150	0.0044
6	HUNTING & TRAPPING PRODUCTS	0.0357	0.0000	0.9643
7	IRON ORES & CONCENTRATES	0.0000	0.0000	1.0000
8	OTHER ORES & CONCENTRATES	0.9235	0.0747	0.0018
9	COAL	0.0000	0.9932	0.0068
10	CRUDE MINERAL PRODUCTS	0.3309	0.6691	0.0000
11	NATURAL GAS	0.0000	0.9999	0.0001
12	NON-METALLIC MINERALS	0.7108	0.1453	0.1439
13	SERVICES INCIDENTAL TO MINING	0.4680	0.5320	0.0000
14	MEAT PRODUCTS	0.6707	0.2669	0.0625
15	DAIRY PRODUCTS	0.8290	0.1684	0.0026
16	FISH PRODUCTS	0.1503	0.1644	0.6854
17	FRUIT & VEGETABLE PREPARATIONS	0.1156	0.7343	0.1501
18	FEEDS	0.6624	0.1468	0.1908
19	FLOUR, WHEAT & OTHER CEREAL	0.2129	0.7794	0.0076
20	CEREAL & BAKERY PRODUCTS	0.4226	0.5085	0.0689
21	SUGAR	0.6176	0.3561	0.0263
22	MISC. FOOD PRODUCTS	0.3165	0.5245	0.1591
23	SOFT DRINKS	0.7478	0.2474	0.0048
24	ALCOHOLIC BEVERAGES	0.4549	0.3676	0.1775
25	TOBACCO, UNMANUFACTED	1.0000	0.0000	0.0000
26	TOBACCO PRODUCTS	0.0000	0.9392	0.0608
27	TIRES & TUBES	0.0114	0.4688	0.5198
28	OTHER RUBBER PRODUCTS	0.1499	0.4887	0.3615
29	PLASTIC FABRICATED PRODUCTS	0.2200	0.5056	0.2744
30	LEATHER & LEATHER PRODUCTS	0.1963	0.5715	0.2323
31	YARNS & MAN-MADE FIBRES	0.1081	0.4203	0.4717
32	FABRICS	0.0415	0.4193	0.5392
33	OTHER TEXTILE PRODUCTS	0.0958	0.7091	0.1951
34	HOSIERY & KNITTED WEAR	0.0235	0.6137	0.3628
35	CLOTHING & ACCESSORIES	0.2587	0.4718	0.2695
36	LUMBER & TIMBER	0.0278	0.7986	0.1735
37	VENEER & PLYWOOD	0.0001	0.9463	0.0537
38	OTHER WOOD PRODUCTS	0.5354	0.3872	0.0774
39	FURNITURE & FIXTURES	0.3985	0.5063	0.0952
40	PULP	0.1969	0.8031	0.0000
41	NEWSPRINT & PAPER STOCK	0.1689	0.6165	0.2146
42	PAPER PRODUCTS	0.3352	0.5534	0.1114
43	PRINTING & PUBLISHING	0.5234	0.2507	0.2259
44	ADVERTISING, PRINT MEDIA	0.8904	0.1096	0.0000
45	IRON & STEEL PRODUCTS	0.1728	0.7392	0.0880
46	ALUMINUM PRODUCTS	0.1580	0.6146	0.2274
47	COPPER & ALLOY PRODUCTS	0.3035	0.6271	0.0694

Data Source: Manitoba Bureau of Statistics
Economic Impact Assessment Model (Medium Level)

TABLE C4 (Cont.): 1984 MANITOBA COMMODITY SUPPLY RATIOS

	COMMODITY	MANITOBA	OTHER CANADA	REST OF THE WORLD
48	NICKEL PRODUCTS	0.1105	0.2456	0.6439
49	BOILERS, TANKS & PLATES	0.3164	0.4353	0.2482
50	FABRICATED STRUCTURAL METAL	0.6627	0.2940	0.0433
51	OTHER FABRICATED METAL PRODUCTS	0.2030	0.5141	0.2830
52	AGRICULTURAL MACHINERY	0.1348	0.0460	0.8192
53	OTHER INDUSTRIAL MACHINERY	0.0917	0.1775	0.7308
54	MOTOR VEHICLES	0.0520	0.1942	0.7538
55	MOTOR VEHICLE PARTS	0.2281	0.1298	0.6421
56	OTHER TRANSPORTION EQUIPMENT	0.2618	0.2493	0.4889
57	HOUSEHOLD APPLIANCES & RECEIVERS	0.0300	0.3213	0.6487
58	OTHER ELECTRICAL PRODUCTS	0.1296	0.5146	0.3558
59	CEMENT & CONCRETE PRODUCTS	0.9620	0.0243	0.0137
60	NON-METALLIC MINERAL PRODUCTS	0.2291	0.4400	0.3310
61	GASOLINE & FUEL OIL	0.0108	0.9679	0.0213
62	OTHER PETROLEUM & COAL PRODUCTS	0.1330	0.8083	0.0587
63	INDUSTRIAL CHEMICALS	0.2088	0.5376	0.2536
64	FERTILIZERS	0.3837	0.3715	0.2447
65	PHARMACEUTICALS	0.1400	0.8100	0.0500
66	OTHER CHEMICAL PRODUCTS	0.1902	0.5537	0.2562
67	SCIENTIFIC EQUIPMENT	0.0598	0.3188	0.6214
68	OTHER MANUFACTURED PRODUCTS	0.1189	0.5527	0.3283
69	RESIDENTIAL CONSTRUCTION	1.0000	0.0000	0.0000
70	NON-RESIDENTIAL CONSTRUCTION	1.0000	0.0000	0.0000
71	REPAIR CONSTRUCTION	1.0000	0.0000	0.0000
72	PIPELINE TRANSPORTATION	0.9373	0.0000	0.0627
73	TRANSPORTATION & STORAGE	0.2540	0.6965	0.0496
74	RADIO & TELEVISION BROADCASTING	0.9835	0.0157	0.0008
75	TELEPHONE & TELEGRAPH SERVICES	0.8567	0.1315	0.0118
76	POSTAL SERVICES	0.9997	0.0000	0.0003
77	ELECTRIC POWER	0.9981	0.0019	0.0000
78	OTHER UTILITIES	0.8451	0.1549	0.0000
79	WHOLESALE MARGINS	0.4629	0.5251	0.0121
80	RETAIL MARGINS	1.0000	0.0000	0.0000
81	RENT, OWNER OCCUPIED DWELLINGS	1.0000	0.0000	0.0000
82	FINANCE, INSURANCE & REAL ESTATE	0.4391	0.5527	0.0082
83	BUSINESS SERVICES	0.3882	0.4983	0.1135
84	EDUCATION SERVICES	0.8766	0.0320	0.0914
85	HEALTH SERVICES	0.7696	0.2161	0.0143
86	AMUSEMMENT & RECREATION SERVICES	0.8749	0.0681	0.0570
87	ACCOMMODATION & FOOD SERVICES	1.0000	0.0000	0.0000
88	OTHER MISCELLANEOUS SERVICES	0.7812	0.2035	0.0153
89	TRANSPORTATION MARGINS	0.1986	0.8014	0.0000
90	MISCELLANEOUS OPERATING SUPPLIES	1.0000	0.0000	0.0000
91	TRAVEL, ADVERTISING & PROMOTION	0.7941	0.2059	0.0000
92	LABOUR INCOME	1.0000	0.0000	0.0000
93	NET INCOME UNINCORP. BUSINESS	1.0000	0.0000	0.0000

Data Source: Manitoba Bureau of Statistics
Economic Impact Assessment Model (Medium Level)